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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/504,813	02/16/2000	Shuji Goto	P99,2486	6161

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EXAMINER	
CREPEAU, JONATHAN	
ART UNIT	PAPER NUMBER
1746	20

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/504,813	GOTO ET AL.	
	Examiner	Art Unit	
	Jonathan S. Crepeau	1746	

-- The MAILING DATE of this communication appears on th cover sheet with the correspondence address --

P ri d for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 17, 2003 has been entered.

This Office action addresses claims 7-10. The claims remain rejected under 35 USC §103 for substantially the reasons of record. Additionally, the claims are newly rejected under 35 USC §112, first paragraph, as necessitated by amendment.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 7-10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 7 has been amended to recite that the positive and negative electrodes are

laminated "directly without a separator." It is the Examiner's position that the originally-filed application does not provide adequate support for the express exclusion of a separator between the two electrolyte-coated electrodes. In fact, there does not appear to be any contemplation or disclosure of expressly excluding *anything* from between the two electrolyte-coated electrodes. It is submitted that the limitation at the end of claim 7 (the electrolyte layers being "integrated with each other into one continuous seamless layer") recites with sufficient clarity and precision that which Applicant considers to be the invention, and covers an interpretation in which nothing is present between the electrolyte layers. Therefore, it is submitted that the amendatory language is at best redundant, and since it raises an issue of new matter, should be deleted.

Claim Rejections - 35 USC § 103

4. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narang et al (U.S. Patent 6,168,885) in view of Schneider et al (U.S. Patent 6,180,281), in further view of Gozdz et al (U.S. Patent 5,840,087) and Kawakami et al (U.S. Pre-Grant Publication No. 2002/0064710).

Regarding claim 7, In Figure 1 and in column 11, lines 4-12, Narang et al. generally teach a process for making a battery comprising the steps of coating a negative electrode with electrolyte (26), coating a positive electrode with electrolyte (36), and laminating the two electrode/electrolyte sheets together under heat (42) so as to form a single, continuous electrolyte. No separator is present between the electrolyte layers. Regarding claim 8, in column

10, lines 42-55, the reference teaches that the solid polymer electrolyte contains a plasticizer (swelling solvent). Regarding claim 8, in column 11, lines 7 and 8, it is further taught that the electrolyte is gelled.

The reference does not expressly teach that the electrode/electrolyte sheets are wound in the lengthwise direction of the sheets (i.e., that the laminate is spirally-wound), or that the electrolyte layers are formed into a "seamless" layer, as recited in claim 7. The reference further does not expressly teach that both sides of each electrode are coated with electrolyte (claim 7), or the temperature or duration of the lamination (claims 9 and 10).

The patent of Schneider et al. is generally directed to composite separator and electrode structures comprising seamless interfaces between the separator and electrodes (see abstract).

The patent of Gozdz et al. is directed to methods of making laminated batteries. As shown in Figure 6, an electrode (67) is coated on both sides with electrolyte material (64) prior to lamination. Gozdz et al. further teach a lamination temperature of about 100-120 degrees C in column 5, lines 52-55.

The publication of Kawakami et al. is directed to rechargeable lithium batteries (see paragraph 82). In paragraph 141, the reference teaches that the batteries can be spirally-wound.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Schneider et al. to form the electrolyte layers of Narang et al. into a "seamless" layer. In column 6, line 30 et seq., Schneider et al. teach that "the interfaces between the advancing polymer boundaries having merged to lose completely any independent identity. The

resulting structure is very pliant, translucent, and smooth, but extraordinarily strong, as shown in the Examples." The reference further teaches in column 2, line 65 et seq. that "the resultant composite allows ions to freely migrate from the electrode domain through the separator domain during successive charging and discharging of the battery." Accordingly, these teachings of Schneider et al. would motivate the artisan to form a "seamless" interface between the electrolyte layers of Narang et al.

Regarding the limitation that the electrodes are wound, the disclosure of Kawakami et al. would motivate the artisan to wind the electrodes of Narang et al. In paragraph 141, Kawakami et al. teach that "[i]n the case where the rechargeable battery is shaped in a spiral-wound cylindrical form, the anode, separator and cathode are arranged in the named order and they are spiral-wound and because of this, there are provided advantages such that the battery area can be increased as desired and a high electric current can be flown upon operating the charging and discharging." It is further noted that Narang et al. teach in column 3, line 17, in a discussion of the prior art, that "[o]ften, the various cells are spiral wound before being provided with a protective coating." Accordingly, the artisan would be motivated by these disclosures, particularly that of Kawakami et al., to wind the electrodes of Narang et al.

Regarding the limitation in claim 7 that both sides of both electrodes are coated with electrolyte, the artisan would be sufficiently motivated to perform this step with the electrodes of Narang et al. Narang et al. teach at column 11, line 9 that "as many layers as necessary can be laminated together to provide the desired capacity of the final electrochemical cell." This disclosure clearly indicates that both sides of each electrode may be coated (to result in, for

example, a stacked cell configuration). Furthermore, as noted above, the artisan would be sufficiently motivated to use a spirally-wound configuration with the electrodes of Narang et al. In order to achieve such a configuration, the artisan would understand that an electrically insulating material would have to present on both sides of each electrode in order to prevent a short circuit. In view of Narang's teaching of multi-layer cells above, the coating of electrically insulating, ion-conductive electrolyte material on both sides of each electrode would be an obvious way of eliminating such a short circuit. The artisan could further look to the patent of Gozdz et al., which, as noted above, teaches a double-sided electrolyte coating on an electrode in Figure 6. In column 6, line 39, Gozdz et al. teach that "prior to assembly and lamination at step (c), carrier films 62 are removed (not shown) to expose the unblemished surfaces of facing separator/electrolyte layers 64, 64 which may then be laminated under reduced temperature and pressure conditions to effect a homogeneous, cohesive bond completing battery cell 50." Thus, it is noted that Gozdz et al. also teach a "seamless" bond in addition to a double-sided electrolyte coating.

Regarding the temperature and time limitations recited in claims 9 and 10, as noted above, Gozdz et al. teach a lamination temperature of about 100-120 degrees C, which overlaps with Applicant's claimed range of 70 to about 100 degrees. Accordingly, Applicant's claimed range would be rendered obvious by the disclosure of Gozdz et al. Further, the recitation of heat treatment "for ten minutes" is also not considered to distinguish over the references. The artisan would possess sufficient skill to manipulate the duration of the heat treatment in order to affect

the characteristics of the resulting electrolyte bond while at the same time being mindful to not damage other battery components by excessive exposure to heat.

Response to Arguments

5. Applicant's arguments filed April 17, 2003 have been fully considered but they are not persuasive. Applicants state that "[t]his is clearly unlike any of the cited references, which fail to disclosure or even suggest that a the [sic] lamination step should be done without a separator." In response, it is asserted that the Narang et al. reference, as noted above, teaches a method wherein two solid-electrolyte layers are directly bonded with each other. A separator is not present in this method (see col. 11, lines 6-12 of Narang et al.). Applicants further state that "[i]n stark contrast, Narang et al. expressly discloses that a mechanical separator should be employed to separate the anode from the cathode." While Narang et al. do teach that mechanical separators "can be advantageously employed" (col. 11, line 13), it is submitted that such inclusion of a separator constitutes a different embodiment than that of using two bonded electrolyte layers. Furthermore, while the reference indeed teaches that separators are beneficial, this does not constitute a teaching away from *not* using separators. There is no statement in the reference that the use of a separator should be avoided. To the contrary, the method of coating two electrodes with electrolyte and directly laminating them is also a preferred embodiment (see Figure 1, abstract). Additionally, even though the Schneider et al. reference discloses a separator, this would not dissuade the artisan from gleaning and applying the other salient features of this

reference (i.e., the teachings regarding the boundary between two polymer layers). Finally, applicants state that the Gozdz reference discloses a separator in the abstract and col. 5, line 52. In response, it is noted that Gozdz always uses the term "separator/electrolyte" when referring to the layers in question. The layers (64) are laminated directly together, as shown in Figure 6 of Gozdz. The layers are formed of a poly(vinylidene fluoride) copolymer, which functions as a gelled electrolyte in the assembled battery. The battery does not contain an inert separator such as polyethylene. Thus, it is submitted that this disclosure is relevant and applicable to Applicant's claimed invention.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (703) 308-4333. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 305-5408 or (703) 305-5433.

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

J. Cuprn
Jonathan Crepeau
Patent Examiner
Art Unit 1746

JSC

June 13, 2003